

REVISED 08/10

LSUE COURSE SYLLABUS

I.	Mathematics 1023	Instructor: Mathematics Faculty
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II.	Course description from the current LSUE catalog:
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1023 Precalculus. Lec. 5 Cr. 5

The study of algebraic, trigonometric, and transcendental functions with emphasis on preparation for calculus. Relations, functions, and their graphs; polynomial functions; exponential and logarithmic functions; trigonometric functions; trigonometric identities and equations; laws of sines and cosines; polar coordinates and equations; parametric equations. Credit will not be given for both this course and MATH 1021 or 1022.

For qualified students, a replacement for MATH 1021 and 1022 as preparation for calculus.

Prerequisite: Math ACT subscore of 23 or higher or placement by department.

III.	Textbook(s) and other required materials:
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College Algebra & Trigonometry, 8th edition by Sullivan

Students are expected to use a graphing calculator as necessary in this course. The TI-83 Plus or TI 84 Plus is recommended. MyMathLab will be used by some instructors and will be bundled with the textbook.

IV.	Evaluation/grading (policy and basis; number and frequency of tests and papers; weights of particular tests or papers; etc.):
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Semester grades are largely determined by performance on hour exams and a comprehensive final exam. Other factors that may be used in determining grades are homework, pop quizzes, recitation, and attendance. A departmental final exam will be given in the event of multiple sections.

V.	Policies pertaining to attendance, late work, make-up work, etc.:
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Students are expected to attend class on a regular basis. Any hour exam which is missed will be made up on a pro-rata basis on the final examination. For example, if a student misses Exam #2, then those questions on the final examination, which pertain to the topics tested on Exam #2 will determine the student's grade on Exam #2. If a student earns 40 of 50 possible points from those questions only, then the student earns 80% on Exam #2.

VI.	Course objectives:
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- A. Development of an understanding, awareness, and appreciation of mathematics.
- B. Enhancement of problem solving abilities.
- C. Enhancement of mathematical communication skills, both in written and oral form.
- D. Improvement of critical thinking and reasoning abilities.
- E. Enhancement of understanding of mathematical structure and operations.
- F. Increased use of multi-media technology as a tool for both learning and performing mathematics.
- G. Heightened awareness of the connectiveness of mathematics, and also its relationship with both other disciplines and the real world.

VII.	Major instructional objectives:
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The student, upon successful completion of this course, will be able to:

- A. Understand the fundamentals of precalculus as presented in the topical outline below
- B. Develop critical thinking and problem-solving skills
- C. Learn how to use the TI-83/84 Plus calculator to solve a variety of problems

VIII.	Brief summary of course content by major units of instruction:
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- A. Graphs
 - 1. The Distance and Midpoint Formulas
 - 2. Graphs of Equations in Two Variables; Intercepts; Symmetry
 - 3. Lines
 - 4. Circles
- B. Functions and Their Graphs
 - 1. Functions
 - 2. The Graph of a Function
 - 3. Properties of Functions
 - 4. Library of Functions, Piecewise-defined Functions
 - 5. Graphing Techniques: Transformations
- C. Linear and Quadratic Functions
 - 1. Linear Functions and Their Properties
 - 2. Quadratic Functions and Their Properties
 - 3. Quadratic Models; Building Quadratic Models from Data
 - 4. Inequalities Involving Quadratic Functions

- D. Polynomial and Rational Functions
 - 1. Polynomial Functions and Models
 - 2. Properties of Rational Functions
 - 3. The Graph of a Rational Function
 - 4. Polynomial and Rational Inequalities
- E. Exponential and Logarithmic Functions
 - 1. Composite Functions
 - 2. One-to-One Functions; Inverse Functions
 - 3. Exponential Functions
 - 4. Logarithmic Functions
 - 5. Properties of Logarithms
 - 6. Logarithmic and Exponential Equations
 - 7. Compound Interest
 - 8. Exponential Growth and Decay Models
- F. Trigonometric Functions
 - 1. Angles and Their Measure
 - 2. Right Triangle Trigonometry
 - 3. Computing the Values of Trigonometric Functions of Acute Angles
 - 4. Trigonometric Functions of General Angles
 - 5. Unit Circle Approach; Properties of the Trigonometric Functions
 - 6. Graphs of the Sine and Cosine Functions
 - 7. Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions
 - 8. Phase Shift; Sinusoidal Curve Fitting
- G. Analytic Trigonometry
 - 1. The Inverse Sine, Cosine, and Tangent Functions
 - 2. The inverse Trigonometric Functions (continued)
 - 3. Trigonometric Identities
 - 4. Sum and Difference Formulas
 - 5. Double-angle and Half-angle Formulas
 - 6. Trigonometric Equations (I)
 - 7. Trigonometric Equations (II)
- H. Applications of Trigonometric Functions
 - 1. Applications Involving Right Triangles
 - 2. The Law of Sines
 - 3. The Law of Cosines
 - 4. Area of a Triangle
- I. Polar Coordinates; Vectors
 - 1. Polar Coordinates
 - 2. Polar Equations and Graphs
 - 3. Vectors

- J. Analytic Geometry
 - 1. The Parabola
 - 2. The Ellipse
 - 3. The Hyperbola
 - 4. Parametric Equations

- K. Systems of Equations and Inequalities
 - 1. Systems of 2x2 Linear Equations

IX.	Methods of instruction:
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The chief method of instruction is the lecture method along with class discussions of the subject matter.

X.	Brief overview of special instructions:
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Students may seek tutorial assistance in the Tutorial Center.

XI.	Bibliography of supplemental references and/or source materials:
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MyMathLab resources available via Internet; SmartThinking Tutoring available via Internet

ADS	(Americans with Disabilities Act) Statement
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Any student who is a “qualified individual with a disability” as defined by Section 504 of the Rehabilitation Act and Title II of the ADA, and who will need accommodated services (e.g., note takers, extended test time, audiotape, tutorials, etc.) for this course must register and request services through the Office of Academic Assistance Programs, S-150.

CSD	CODE OF STUDENT CONDUCT
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LSUE enforces discipline on campus to protect the academic environment of the campus and the health and safety of all members of the University community. To accomplish this objective, the University enforces standards of conduct for its students. Students who violate these standards can be denied membership in the LSUE community through imposition of disciplinary sanctions.

The LSUE Code of Student Conduct can be found on the LSUE website (lsue.edu). Follow the “Current Students” link from the homepage, and then click on “Student Handbook.”

MATH 1023 OUTLINE

08/10

2.1, 2.2, 2.3, 2.4

3.1, 3.2, 3.3, 3.4, 3.5

4.1, 4.3, 4.4, 4.5

5.1, 5.2, 5.3, 5.4

6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8

7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8

8.1, 8.2, 8.3, 8.4, 8.5, 8.7, 8.8

9.1, 9.2, 9.3, 9.4

10.1, 10.2, 10.4

11.2, 11.3, 11.4, 11.7

12.1

MATH 1023 PRECALCULUS TOPICS AND OBJECTIVES

2.1 Rectangular Coordinate System

- Use the distance formula
- Use the midpoint formula

2.2 Intercepts and Symmetry

- Find intercepts from a graph
- Find symmetry from a graph
- Find intercepts from an equation
- Find symmetry from an equation

2.3 Lines

- Calculate and interpret the slope of a line
- Graph lines given a point and the slope
- Find the equation of a vertical line and of a horizontal line
- Use the point-slope form of a line
- Write the equation of a line in slope-intercept form
- Write the equation of a line in general form
- Define parallel lines and find equations of parallel lines
- Define perpendicular lines and find equations of perpendicular lines

2.4 Circles

- Write the standard form of the equation of a circle
- Graph a circle
- Find the center and radius of a circle in standard form and graph
- Find the center and radius of a circle in general form and graph

3.1 Functions

- Determine whether a relation represents a function
- Find the value of a function
- Find the domain of a function
- Find the range of a function

3.2 Graph of a Function

- Identify the graph of a function
- Obtain information from or about the graph of a function

3.3 Properties of Functions

- Determine even and odd functions from a graph
- Determine even and odd functions from an equation
- Use a graph to determine...increasing, decreasing, or constant
- Use a graph to locate local maxima and minima

3.4 Graphs of Basic Functions and Piecewise-defined Functions

- Graph the basic functions
- Graph piecewise-defined functions

3.5 Graphing Techniques: Transformations

- Graph basic functions using horizontal and vertical shifts
- Graph basic functions using compressions and stretches
- Graph basic functions using reflections about the x- or y-axis

4.1 Linear Functions

- Graph linear functions
- Use average rate of change to identify linear functions
- Determine whether a linear function is increasing, decreasing, or constant

4.3 Quadratic Functions

- Graph a quadratic function using transformations
- Identify the vertex and axis of symmetry of a quadratic function
- Graph a quadratic function using its vertex, axis, and intercepts
- Use max/min value of a quadratic function to solve applied problems

4.4 Quadratic Models; Building Quadratic Functions from Data

- Solve applied problems involving quadratic functions
- Use a graphing utility to find the quadratic function of best fit

4.5 Inequalities Involving Quadratic Functions

- Solve inequalities involving a quadratic function

5.1 Polynomial Functions

- Identify polynomials and their degree
- Graph polynomial functions using transformations
- Analyze the graph of a polynomial function

5.2 Properties of Rational Functions

- Find the domain of rational functions
- Identify vertical asymptotes
- Identify horizontal asymptotes

5.3 Graphs of Rational Functions

- Graph rational functions

5.4 Polynomial and Rational Inequalities

- Solve polynomial inequalities
- Solve rational inequalities

6.1 Composite Functions

- Form the composite function
- Find the domain of a composite function

6.2 Inverse Functions

- Determine the inverse of a function
- Obtain the graph of the inverse function from the graph of the function
- Find the inverse function

6.3 Exponential Functions

- Evaluate exponential functions
- Graph exponential functions
- Define the number e
- Solve exponential equations

6.4 Logarithmic Functions

- Change exponential expressions to logarithmic expressions
- Change logarithmic expressions to exponential expressions
- Evaluate logarithmic functions
- Determine the domain of a logarithmic function
- Graph logarithmic functions
- Solve simple logarithmic equations

6.5 Properties of Logarithmic Functions

- Work with the properties of logarithms
- Write a logarithmic expression as a sum or difference of logarithms
- Write a logarithmic expression as a single logarithm
- Evaluate logarithms whose base is neither 10 nor e

6.6 Solving Logarithmic and Exponential Equations

- Solve Logarithmic equations using the properties of logarithms
- Solve exponential equations using logarithms

6.7 Compound Interest

- Determine the future value of a lump sum of money
- Determine the time required to double or triple a lump sum of money

6.8 Exponential Growth and Decay

- Find equations of populations that obey the Law of Uninhibited Growth
- Find Equations of Populations that obey the Law of Decay

7.1 Angles and Their Measure

- Convert between decimals and degrees, minutes, seconds forms for angles

- Convert from degrees to radians and from radians to degrees
- Find the area of a sector of a circles

7.2 Right Triangle Trigonometry

- Find the values of trigonometric functions of acute angles
- Use the fundamental identities
- Find the values of the remaining trigonometric functions, given the value of one of them
- Use the Complementary Angle Theorem

7.3 Computing the Values of Trigonometric Functions of Acute Angles

- Find the exact value of the trigonometric functions of $\frac{p}{4}=45^\circ$
- Find the exact values of the trigonometric functions of $\frac{p}{6}=30^\circ$ and $\frac{p}{3}=60^\circ$
- Use a calculator to approximate the values of the trigonometric functions of acute angles
- Model and solve applied problems involving right triangles

7.4 Trigonometric Function of General Angles

- Find the exact values of trigonometric functions for general angles
- Use coterminal angles to find the exact value of trigonometric functions
- Determine the signs of the trigonometric functions of an angle in a given quadrant
- Find the reference angle of a general angle
- Use a reference angle to find the exact value of a trigonometric function
- Find the exact values of trigonometric functions of an angle, given information about the functions

7.5 Unit Circle Approach; Properties of the Trigonometric Functions

- Find the exact values of the trigonometric functions using the unit circle
- Know the domain and range of the trigonometric function
- Use the periodic properties to find the exact values of the trigonometric functions
- Use even-odd properties to find the exact values of the trigonometric functions

7.6 Graphs of the Sine and Cosine Functions

- Graph functions of the form $y=A \sin wx$ using transformations
- Graph functions of the form $y=A \cos wx$ using transformations
- Determine the amplitude and period of sinusoidal functions
- Find an equation for a sinusoidal graph

7.7 Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions

- Graph functions of the form $y = A \tan wx + B$ and $y = A \cot wx + B$
- Graph functions of the form $y = A \csc wx + B$ and $y = A \sec wx + B$

7.8 Phase Shift; Sinusoidal Curve Fitting

- Graph sinusoidal functions of the form $y = A \sin wx - j + B$

8.1 The inverse Sine, Cosine, and Tangent Functions

- Find the exact value of inverse sine, cosine, and tangent functions
- Find an approximate value of inverse sine, cosine, and tangent functions
- Use properties of inverse functions to find exact values of certain composite functions
- Find the inverse function of a trigonometric function
- Solve equations involving trigonometric functions

8.2 The Inverse Trigonometric Functions (continued)

- Find the exact value of expressions involving the inverse sine, cosine, and tangent functions

8.3 Trigonometric Identities

- Use algebra to simplify trigonometric expressions
- Establish identities

8.4. Sum and Difference Formulas

- Use sum and difference formulas to find exact values
- Use sum and difference formulas to establish identities
- Use sum and difference formulas involving inverse trigonometric functions

8.5 Double-Angle and Half-Angle Formulas

- Use double-angle formulas to find exact values
- Use double-angle formulas to establish identities
- Use half-angle formulas to find exact values

8.7 Trigonometric Equations (I)

- Solve equations involving a single trigonometric function

8.8 Trigonometric Equations (II)

- Solve trigonometric equations quadratic in form
- Solve trigonometric equations using identities
- Solve trigonometric equations linear in sine and cosine

9.1 Applications Involving Right Triangles

- Solve right triangles
- Solve applied problems

9.2 The Law of Sines

- Solve SAA or ASA triangles
- Solve SSA triangles
- Solve applied problems

9.3 The Law of Cosines

- Solve SAS triangles
- Solve SSS triangles
- Solve applied problems

9.4 Area of a Triangle

- Find the area of SAS triangles
- Find the area of SSS triangles

10.1 Polar Coordinates

- Graph and identify polar equations by converting to rectangular equations
- Test polar equations for symmetry
- Graph polar equations by plotting points

10.2 Polar Equations and Graphs

- Graph and identify polar equations by converting to rectangular equations

10.4 Vectors

- Graph vectors
- Find a position vector
- Add and subtract vectors algebraically
- Find a scalar multiple and the magnitude of a vector
- Find a unit vector
- Find a vector from its direction and magnitude

11.2 The Parabola

- Identify the equation of a parabola from its graph

11.3 The Ellipse

- Identify the equation of an ellipse from its graph

11.4 The Hyperbola

- Identify the equation of a hyperbola from its graph

11.7 Plane Curves and Parametric Equations

- Graph parametric equations

12.1 Systems of Linear Equations: Substitution and Elimination

- Solve a 2x2 system of linear equations